Patrick Lemieux

Education

Ph.D. Mechanical Engineering, California Institute of Technology, Pasadena, California
M.S. Mechanical Engineering, Cranfield University, Bedford, England
B.S. Mechanical Engineering, University of New Brunswick, Fredericton, Canada

Academic Experience

Teaching and research areas include gas turbine engines, reciprocating engines, refrigeration systems, fuels and combustion, wind energy and wind turbine systems, heat exchange processes, thermodynamics, fluid mechanics, systems control

- California Polytechnic State University, San Luis Obispo: Professor of Mechanical Engineering, 2012-present.
- Munich University of Applied Sciences (Hochschule München), Munich, Germany: Mechanical Engineering Summer School Lecturer, 2014-present
- California Polytechnic State University, San Luis Obispo: Associate Professor of Mechanical Engineering, 2007-2012
- California Institute of Technology: Graduate Teaching & Research Assistant, 1994-1999

Consulting & Industrial Experience

Areas of professional expertise include the investigation of accidents, failures and operation of thermal systems, primarily those concerning reciprocating and gas turbine engines, as well as combustion analyses including fire and explosion cause and origin; analyses of Environmental Control Systems (ECS), Internal Combustion Engines, Gas Turbine Power Plants, Wind Turbines, Refrigeration Systems and HVAC.

- **Expert Witness (including trial testimony), Los Angeles Superior Court**
- **Intellectual Property:** designated Inter Partes Review (IPR) expert for international commercial gas turbine manufacturer
- **Engines:** designed & completed SAE performance verification tests on dynamometer test cells
- **Combustion:** performed investigations of natural gas and propane gas leaks, including flow rates, ignition and explosions
- **Wind Energy:** active area of research. Experience includes, e.g., Mechanical Systems Subgroup Leader, "SMART Wind Consortium: Developing a Consensus-Based Sustainable Manufacturing, Advanced Research and Technology Roadmap for Distributed Wind"
- **polyXengineering Inc**., San Luis Obispo, CA: Co-Founder and President, 2016-present
- **Exponent Inc.**, Los Angeles, CA: Failure Analysis Engineering Consultant, 2000-2006
- **Honeywell International**, Torrance, CA: Staff Engineer (Engines; Environment Control Systems), 1999-2000
- **IBM Canada Ltd,** Toronto, ON: Engineer Trainee, 1989-1990

Membership in Professional Associations:

- **Associate Fellow**: American Institute of Aeronautics and Astronautics (AIAA)
- Technical Committee Member:
  - American Institute of Aeronautics and Astronautics (AIAA), Hybrid Rockets (2014-present)
  - National Fire Protection Association (NFPA), Aircraft Maintenance Operations NFPA 410 (2005-2008)
- Member: American Society of Mechanical Engineers (ASME)
- Licensed Mechanical Engineer, M 32617: California Board for Professional Engineers and Land Surveyors (2003-present)
- Licensed pilot, Multi-Engine Land

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Patents

- "Windpower LifeLine," (provisional application #62/663,513), DOE "S" #T-117026, iEdison Report #0513609-18-0001
- "Air-Cycle Environmental Control Systems and Methods for Automotive Applications", Patent No.: US 9,249,998 B2, 17 additional claims allowed for Method, Sept. 2017
- "System, Method and Apparatus for Improving Gas Turbine Performance with Compressed Air Energy Storage", U.S. Department of Commerce, U.S. Patent and trademark Office; Pub. No.: US 2017/0254265 Al, Sept. 2017
- "Air-Cycle Environmental Control Systems and Methods for Automotive Applications", Patent No.: US 9,249,998 B2, Feb. 2016
- "System, Method and Apparatus for Cooling Rocket Motor Components Using a Saturated Liquid-Vapor Coolant Mixture", Patent No.: US 8,776,494 B2, 2014

Selected Honors and Awards

- Bently Professor of Mechanical Engineering, California Polytechnic State University, San Luis Obispo, 2010-2014; 2017-2019
- Chrones Professor of Mechanical Engineering, California Polytechnic State University, San Luis Obispo, 2007-2008.
- Exponent 'Excellence Award' for engineering work on the modeling of the World Trade Center, 2002.
- Charles Lee Powell Graduate Fellowship, Caltech, 1997-1998.
- Natural Sciences and Engineering Research Council of Canada PGS-A and PGS-B scholarships for tenure at Caltech, 1992-1996.
- Daniel and Florence Guggenheim Fellowship in Jet Propulsion, 1992-1994.
- Athlone-Vanier Engineering Fellowship, for graduate studies in the U.K. (three awarded per year in Canada), 1991-1992.
- John Stephens Memorial Prize for highest standing in the graduating Mechanical Engineering Class of 1991 at the University of New Brunswick, Canada.

Student Awards

- California Polytechnic State University Outstanding Graduate Thesis Award, George Katsanis, June 2014

Selected Publications

Arribas PS, Lemieux P, Pastrone D "Modeling of N_2O Heat Transfer Rates in the Nucleate Boiling Regime, with Experimental Verification", AIAA/ASME 51st Joint Propulsion Conference, Orlando, Florida, 2015

Lemieux P, Fara A, Sanchez P, Murray WR "Development and Test of an Experimental Apparatus to Study Thermal-Choking in Ideal Gases and Self-Decomposition in Superheated N2O", Journal of Energy and Power Engineering, 2014

Lemieux P, Murray WR, Cooke T and Gerhard J "An 'Inefficient Fin' Non-Dimensional Parameter to Measure Gas Temperature Efficiently", NASA Tech Briefs, Vol. 36, No. 5, 2012

Lemieux P, Moore CD and Nahab A "Performance Measurement and Analysis of Vertical Shaft V-Twin Engines, and Comparison with Horizontal Engines of the Same Model Class", ASME Internal Combustion Engine Division Fall Technical Conference, 2012

Selected Publications (cont'd)

Katsanis G and Lemieux P "Transient Small Wind Turbine Tower Structural Analysis with Coupled Rotor Dynamic Interaction", American Wind Energy Association, Windpower2012 Conference, Atlanta, Georgia, June 2012

Lemieux P, Moore CD, Gerhardt JG and Dershowitz A "Engine Performance Measurements of Four V-Twin Engines, Using SAE J1349 Correction Factors", SAE/JSAE Small Engine Technology Conference, Sapporo, Japan, 2011

Hornung HG, Lemieux P, Kaneshigue M and Valiferdowwsi B "Two Effects of High Density Ratio Across Bow Shocks, Part I", 41st AIAA Fluid Dynamics Conference and Exhibit, Honolulu, 2011 [Note: Paper received '2011 Fluid Dynamics Award']

Lemieux P "Nitrous Oxide Cooling in Hybrid Rocket Nozzles", Progress in Aerospace Sciences, V46, Issue 2, 2010

Nosti C and Lemieux P "Performance Analysis and Life Prediction for Small Wind Turbine Blades: A Wood Laminate Case Study", American Wind Energy Institute Windpower, 2008

Katsanis, G. and P. Lemieux "Dynamic Simulation of Small Wind Turbine Towers", American Wind Energy Institute Windpower, 2008

Schroeder, S., D. Slee and P. Lemieux "Pfizer Motor Bearing Failure Investigation", Pfizer Facilities Management and Engineering, San Diego, CA, 2006.

Lemieux, P., and H.G. Hornung "Development and Application of Streakline Visualization in Hypervelocity Flow", Experiments in Fluids, 2002.

Lemieux P. and R. Carnahan "Transient Pressure and Momentum Balance Failure Analysis in a Two-Phase Flow Geothermal Power Generation Pipeline", CalEnergy Generation, 2002.

Hornung, H.G., and P. Lemieux "Shock Instability Near the Newtonian Limit Of Hypervelocity Flows," Physics of Fluids, 2001.